REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. Claims 1, 4, 5, 8, 10, 15 and 16 are currently being amended. Claims 1-20 are therefore pending in the case, and the Applicant respectfully requests reconsideration of the claims as amended.

Claims 1, 2, 7-13 and 17-69 were rejected as anticipated under 35 USC 102(b) by USPN 4,646,070. The '070 patent is directed to sensing the changing dielectric-constant by use of a parallel plate capacitor disposed in an oil medium. As stated at col. 2, ll. 56-59, "The impedance and capacity of the sensor capacitor vary as a function of the dielectric-constant or permittivity of the vibrating oil." In the case of the invention of the Applicant, the sensor comprises a contact potential difference measurement system which includes two different conductive materials, such as two different metals, which when electrically connected create an electrochemical cell, and an electrical current will be generated by contact with the electrically conductive intervening oil. As stated further in the Applicant's Detailed Description on p. 4:

> As the oil 46 flows past the two surfaces of the materials 20 and 30, the electrical filed, $\mathcal{E}$, separates the charges of the oil 46, the positive charges tending toward the negative surface and vice versa. The current density will depend on the interfacial electron transfer reactions of the oil 46 and its constituents or the temperature and on the contact potential difference between the materials 20 and 30.

Further, on p. 5 of the Applicant's Detailed Description in full paragraph two:

> FIGS. 3 and 4 illustrate conceptually the separation of the oil molecules 45 which impinge on walls 60 and 65 of the materials 20 and 30, respectively. A resulting contact potential V will then develop and is shown schematically in FIG. 5 as a function of time of oil use. The plot can yield signatures associated with the chemical or dielectric state of the oil 46.

Consequently, the contact potential sensor functions in a completely different way to measure chemical changes of the oil, with no measurements being made by capacitance measurements across the gap but by generating a contact potential and current flow due to electrochemical differences of Fermi levels in the two different conductive electrodes disposed in the oil. Nowhere in the '070 is there any teaching or fairly based suggestion that the capacitor embodiment must have two different electrodes in order to measure contact potential. Rather, there are multiple references to parallel plate capacitors where the capacitance can readily and consistently be measured when the two capacitor plates are of the same material, which of course is the well know, conventional and routine construction of capacitors. As a result of these important differences, claims 1, 2, 7-13 and 17-19 are patentable over the '070 patent.

Regarding the rejection of claims 3-6 under 35 USC 103(a) as unpatentable over the '070 patent, once again the '070 patent does not teach or disclose a contact potential difference sensor since there is no recognition that you must have two different types of material electrodes in order to establish a contact potential difference sensor. Further, it is important in claim 3 that the contact potential measurement is done on both standard fluid and the test fluid in order to establish test fluid condition. In view of these distinctions, claims 3-6 are patentable over the '070 patent.

The Examiner further rejected claims 14-16 and 20 as obvious over '070 in combination with USPN 6,278,281. The '281 patent, as for '070, is directed only to a capacitance spaced array electrode which does not teach or disclose the use of a contact potential difference sensor. In fact the '281 patent requires application of an oscillating voltage to the capacitor in order to carry out its measurements. No such applied voltage is needed for the invention of the Applicant which instead creates its own voltage output by virtue of the contact potential difference between two different conductive materials. Consequently, claims 14-16 and 20 are patentable over the '070 in combination with the '281 patent.

The Applicants also very recently received a new prior art reference "Nonvibrating Contact Potential Difference Probe Measurement of a Nanometer-Scale Lubricant on a Hard Disk"; and this reference is enclosed being submitted in a Supplemental Information Disclosure Statement for review by the Examiner. The Applicants however believe the reference does not teach or disclose the features of the claims as amended.

The new reference teaches detection of the presence of a very thin 10 nm thick oil layer on a surface of a hard disk. The reference measures only the presence of a difference in the contact potential difference between a metal desk and a 10 nm thick layer of oil in the form of: "some change in the overall dielectric properties in the air gap between the probe and the disk surface due to the present of the nanometer-scale film." (see p. 982 of the prior art reference under "Discussion" section, par. 1) There is therefore no teaching or disclosure of measuring a bulk oil environment to ascertain chemical changes of the oil (see amended claims). Instead the new prior art reference teaches away from characterizing the chemical properties of the oil itself, but only teaching that the mere presence of an ultra-thin, nanometer thick lubricant can be detected since the presence causes "some changes in the overall dielectric properties in the air gap." Consequently, the new reference does not teach the combination of elements found in the amended claims.

In view of the explanation and clarification of the nature of a contact potential difference sensor, it is believed claims 1-20 are in condition for allowance.

This Amendment changes claims in this application. After amending the claims as set forth above, claims 1-20 are still pending in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 06-1450. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 06-1450. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 06-1450.

Respectfully submitted,

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